EUB
Alberta Energy and Utilities Board

Alberta
ENVIRONMENT

NRCB
Natural Resources Conservation Board

Cumulative Effects Assessment in Environmental Impact Assessment Reports Required under the Alberta Environmental Protection and Enhancement Act

Introduction

This document provides general guidance from Alberta Environment (AENV), the Energy and Utilities Board (EUB) and the Natural Resources Conservation Board (NRCB) on the scope and content of the cumulative effects assessment (CEA) component of an EIA Report. It describes the type and nature of issues that arise when proponents begin to address cumulative effects.

Energy and utility development applications in Alberta are subject to review for approval by the EUB. Natural resource development applications are subject to review for approval by the NRCB. An Environmental Impact Assessment (EIA) report is required for certain energy, utility and natural resource developments,[1] as defined in the Alberta Environmental Protection and Enhancement Act (AEPEA). Under AEPEA, the Director of Environmental Assessment (Director) for Alberta Environment requires an EIA report, which is filed as part of a company's application to one of the respective boards. The boards use the information in the EIA report in their project evaluation. Thus, the environmental assessment process in Alberta is integrated with the approval processes of the EUB and the NRCB.

Each EIA report required under the AEPEA is prepared in accordance with final terms of reference for the report issued by the Director. It includes the following unless the Director provides otherwise:

> *...a description of potential positive and negative environmental, social, economic and cultural impacts of the proposed activity, including cumulative, regional, temporal and spatial considerations.*[2]

Scope

This document should not be taken as an indication of how the Director of Environmental Assessment will exercise the discretion provided by AEPEA to tailor the cumulative effects assessment requirements to suit to the particular circumstances of individual projects. Every EIA report will have its own specific terms of reference set by the Director.

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[1] Alberta Environmental Protection and Enhancement Act. Environmental Assessment (Mandatory and Exempted Activities) Regulation. Alberta Regulation 111/93.

[2] Alberta Environmental Protection and Enhancement Act s. 47(d).

Certain projects in Alberta are also subject to review by agencies of the federal government under the Canadian Environmental Assessment Act (CEAA). The federal legislation includes a requirement for a CEA that complements provincial requirements.[3] Projects that require an environmental assessment under both federal and Alberta provincial law are reviewed under the Canada-Alberta Agreement for Environmental Assessment Cooperation. Those assessments must satisfy both provincial and federal requirements.

Alberta does not intend to prescribe the use of specific CEA methodologies because the magnitude, extent and duration of environmental effects depend on the characteristics of a development activity in a particular location. Proponents must have the flexibility to select the best approaches for their individual circumstances.

Defining Cumulative Effects

Cumulative effects are caused by the accumulation and interaction of multiple stresses affecting the parts and the functions of ecosystems. Of particular concern is the knowledge that ecological systems sometimes change abruptly and unexpectedly in response to apparently small incremental stresses.

Numerous definitions of cumulative effects exist. While the nuances of the definitions vary, they all suggest that the assessment of cumulative effects presents some unique challenges that require a departure from conventional impact assessment methodologies. For the purposes of this document, cumulative effects are defined as

> **the changes to the environment caused by an activity in combination with other past, present, and reasonably foreseeable human activities.**

The CEA component of an EIA report should document predicted changes to the environment that might be reasonably anticipated from a proposed activity in combination with other activities. The following table outlines various scenarios that should be considered when preparing CEAs.

What to look for	Explanation
Effects of past, present and future developments and activities that might interact with the effects of the proposed project.	See "Identifying Projects and Activities to Include in a CEA" below.
Disturbances similar to those related to the proposed activity, regardless of their source.	For an activity creating atmospheric emissions, for example, this would include other sources of emissions. For an activity causing habitat loss, this would include other kinds of habitat disturbance.
Interactions among dissimilar kinds of disturbance.	This might include, for example, the combined effects of physical disturbances such as habitat fragmentation and chemical pollution.

[3] Those involved in the practice of cumulative effects assessment are encouraged to review *Cumulative Effects Assessment Practitioners Guide*, Hegmann, G., C. Cocklin, R. Creasey, S. Dupuis, A. Kennedy, L. Kingsley, W. Ross, H. Spaling and D. Stalker. 1999. Published by the Canadian Environmental Assessment Agency. Federal requirements for cumulative effects assessment are found in the Canadian Environmental Assessment Act.

Time and Space

A CEA should include a discussion of historical developments and activities that have created the current "baseline" conditions. It should clearly

- describe the state of the environment that will be affected by the proposed development;
- predict the incremental consequences of developing the project;
- identify potential interactions of stresses created by the project with other stresses and, if possible;
- predict the cumulative consequences of those combined effects.

There are no hard and fast rules about how far into the future predictions of a CEA should go. In practice, the choice of a time horizon for the assessment of future cumulative impacts is a matter of professional judgement. In general, a time horizon and a series of dates between the present and the time horizon should be chosen to enable a full exposition of any transient effects and residual permanent effects. The spatial boundary of a cumulative effects assessment should consider the limit, if any, where a significant residual environmental effect can reasonably be expected. All assumptions used in defining the temporal and spatial boundaries for a CEA must be clearly stated.

Identifying Projects and Activities to Include in a CEA

Past and current projects and activities to include in a CEA can be readily identified once the temporal and spatial boundaries of a project's effects are identified. Simply, if the effects of those projects and activities overlap those of the project under review in space or in time, they should be included.

CEA predictions should take into account that baseline conditions, i.e., those without the project under review, are not static. The development of a proposed project may coincide with other nearby projects and activities. Changes in natural systems (e.g., climate, and forest fires) may also coincide with project impacts. CEA predictions must therefore have regard for reasonably foreseeable projects, activities and natural events that could affect the magnitude, duration or significance of a project's cumulative effects.

It might appear simpler to avoid uncertainty by including only those projects and activities known with certainty. However, such seemingly more solid predictions almost certainly underestimate cumulative effects by neglecting the current understanding of what is reasonably foreseeable. Predictions of this kind are of limited value in the exploration of potential cumulative effects because they anticipate the lower bounds of plausible future conditions.

Other scenarios are better suited to the purpose of environmental assessment, which is to identify and avoid potential adverse environmental impacts. The likelihood and potential magnitude of natural events, such as one in 100-year flood levels, earthquakes and forest fires, are routinely considered in designing facilities capable of withstanding these reasonably foreseeable natural events. The same precautionary principle applies to the assessment of cumulative effects. By considering what could happen if natural events, activities and other projects coincide with a proposed project, practitioners seek to avoid adverse impacts. Natural trends and events should be considered if they could alter the assessment of project impacts or prospects for mitigation. Reasonably foreseeable activities would include those that are ongoing and are likely to continue, for example, off-highway vehicle recreation, and those that can be anticipated as a

result of external trends, such as increasing tourism. Reasonably foreseeable projects should include the following categories of projects unless there is a particular circumstance to warrant their exclusion:

- approved
- currently undergoing regulatory review
- about to be submitted for review
- officially announced by a proponent
- directly associated with the project under review
- not directly associated, but induced if the project is approved
- identified in a development plan for the area

A rationale should be given for excluding specific future projects and activities that appear to fit one of the above categories. Beyond these reasonably foreseeable projects and activities are more speculative possibilities. These are not a required part of a CEA.

The regulatory agencies appreciate the inherent uncertainties of predicting future developments. They also realize that the proponent compiling the CEA will not be responsible for many of the future activities and their impacts. Nonetheless, the agencies believe that potential future activities can be compiled and analyzed. Cumulative effects scenarios can be based on current knowledge and an analysis of factors affecting development in the region. Proponents should consult with adjacent industrial operators and incorporate information about their anticipated growth into their CEAs. A reasonable attempt to gather information must be demonstrated.

Dealing with Uncertainty

The purpose of an EIA report is to predict potential adverse impacts of development and to design remedies to prevent or mitigate them. The purpose of a CEA is substantially the same. However, the complexity, scale and inherent uncertainties associated with predicting future activities are greater in CEAs.

The regulators are aware that uncertainty is part of a CEA. The largely unavoidable sources of uncertainty include imperfect knowledge of baseline conditions and present activities, limited understanding of the primary and indirect impacts of activities and their interactions, and uncertainties about future development scenarios. What the regulators expect from proponents is:

- a description of efforts to obtain data concerning the impacts of those projects and activities,
- an exploratory analysis of potential outcomes based on the best available information and science and a range of plausible assumptions about the future course of development,
- a description of how the proponent proposes to monitor uncertain outcomes, and
- the proponent's plans to respond to unfavourable outcomes, should they arise.

In other words, proponents should describe how they plan to adaptively manage possible future outcomes identified in the CEA.

Criteria for a CEA

The environmental assessment process requires cumulative environmental effects to be documented and analyzed. At minimum, the questions presented in the following table should be addressed.

Assessment Phase	Expected Information
Scoping	1. What are the main cumulative effects issues attributed to the project? What are the main cumulative effects issues attributed to other projects and activities in the region? 2. How were the appropriate limits to the geographical and temporal boundaries determined? Why are these considered appropriate? 3. Identify the resource management initiatives and policies pertinent to the project.
Identifying Future Activities	4. What activities/actions or projects have or will have effects that may interact with the impacts associated with the project? How are these effects accounted for in the CEA? 5. How were the "reasonably foreseeable future projects" determined? Describe the consultation process used to identify future activity, including rationale and assumptions. Are relevant past, present and future projects described adequately? 6. How are future trends in population growth, recreation and industrial growth accounted for? What factors will influence the rate of growth of human activity? What regulatory processes are in place to deal with the future activity?
Analyzing Effects	7. What is the relative contribution of the project to this overall situation? 8. What are the responses and trends of the valued ecosystem components (VECs) to the identified cumulative effects? What will be the cumulative effect of the project on selected indicators? 9. What is the relationship between the sources of environmental stress caused by the project and subsequent effects on VECs? 10. How are uncertainty and risk dealt with? How does the assessment deal with the inevitable uncertainty entailed in predicting the likelihood and magnitude of future events, i.e., risk?

Assessment Phase	Expected Information
	11. What are the magnitudes, duration, extent and significance of residual impacts? What is the relationship of effects to existing thresholds[4] and ecological indicators? 12. What specific government and/or company goals and management objectives exist or are proposed to address the project's cumulative effects?
Adaptive Management	13. What monitoring and research are needed to detect adverse outcomes and reduce critical uncertainties? How will feedback from monitoring be incorporated into the long-term project operations? 14. What documentation is envisioned or required during the life of the project? What reporting mechanisms are anticipated?

Questions regarding this document can be directed to Alberta Environment, Environmental Assessment Branch, at (780) 427-5828, fax at (780) 427-1594 or by email to "environmental.assessment@gov.ab.ca".

[4] In this document a threshold is defined as a limit of tolerance of a VEC to an effect that if exceeded results in an adverse response by that VEC (Hegmann, G. *et al.*, 1999 [see footnote 3]).